



FISH PASSAGE CENTER

1827 NE 44th Ave., Suite 240, Portland, OR 97213

Phone: (503) 230-4099 Fax: (503) 230-7559

<http://www.fpc.org/>
e-mail us at fpcstaff@fpc.org

MEMORANDUM

TO: Bill Tweit, WDFW
Guy Norman, WDFW

Michele DeHart

FROM: Michele DeHart

DATE: June 24, 2011

RE: Columbia & Snake Rivers Smolt Monitoring Program Gas Bubble Trauma –
June 24 2011 Update

In response to your request the FPC staff has updated the Columbia & Snake Rivers Smolt Monitoring Program Gas Bubble Trauma memo with data collected over the past week. Below is a list of the results from the GBT monitoring over the past week (June 17-23, 2011), followed by data for GBT monitoring for the 2011 season so far.

- The present spill and flow levels continue to be the result of the high run-off volume.
- The river system is no longer being managed to only flood control. Since Monday, June 20th, management of the river system is now for refill and flood control.
- Over the past week, total dissolved gas levels continued to exceed the 115/120% at most of the Mid Columbia, Snake and lower Columbia rivers, with the exception of a couple isolated incidences at a few TDG monitors in the Snake and Lower Columbia.
- Compared to last week, levels of gas bubble trauma at the Mid-Columbia River project increased, while GBT at the Snake and Lower Columbia River projects were consistent with or decreased from last week. GBT monitoring results over the past week are as follows:
 - LGR – There continue to be no signs of GBT
 - LGS – GBT incidence decreased to 2% on June 20th
 - LMN – GBT incidence decreased to 4% on June 22nd
 - MCN – GBT incidence remained in the 0-2% range this week, with exams on June 17th, June 19th, and June 23rd.

- BON – 0% GBT incidence on June 18th and June 21st
- RIS – GBT incidence increased to nearly 11% on June 22nd and 26% on June 23rd.
- The only project with GBT incidence above the criteria for the curtailment of spill this week was RIS on June 23rd. However, all Snake and Columbia River projects are operating under uncontrolled spill and, thus, specific actions to curtail spill are not available. The 5% severe fin GBT action criterion has not been met at any of the GBT monitoring sites.
- **Since last week, the FPC staff has received clarification on the location of the Chief Joseph tailrace TDG monitor. This monitor is located on the spillway side of the project and measures mostly non-mixed water that is coming from the spillway. In addition, the FPC has learned that this tailrace monitor was placed into a pipe, in order to protect it during the high flows (on or around June 5th) this year. These two factors result in TDG readings that are likely unrepresentative of tailrace TDG. This is evident when considering that TDG levels in the Wells Dam forebay have routinely been about 5% higher than the Chief Joseph tailrace since June 5th.**

GBT Monitoring:

As part of the state TDG waivers, biological monitoring for Gas Bubble Trauma (GBT) is conducted throughout the Mid-Columbia, Snake, and Lower Columbia rivers. There are two action criteria for the curtailment of voluntary spill under this biological monitoring. First, spill can be curtailed if 15% of the examined fish show signs of fin GBT, regardless of their rank. Second, spill can be curtailed if 5% of the examined fish show severe signs ($\geq 26\%$ fin occlusion) of GBT. GBT monitoring at each of the sites typically takes place once or twice a week.

Mid-Columbia Monitoring:

Rock Island Dam is the only site in the Mid-Columbia River where GBT examinations are conducted as part of the GBT monitoring program. These examinations are typically conducted twice a week. To date, the 12-hour average TDG levels (based on Oregon methodology) in the Rock Island Dam forebay (RIS) have ranged from 104.9 to 131.4%. Moving up stream of Rock Island Dam, the 12-hour average TDG levels in the Rocky Reach Dam tailrace (RRTW) have ranged from 104.9 to 135.4%, TDG in the Wells Dam (WEL) tailrace has ranged from 105.4% to 137.8%, TDG in the Chief Joseph Dam (CHJ) tailrace has ranged from 103.4 to 123.6%, and TDG downstream of Grand Coulee Dam (GCL) has ranged from 103.7 and 144.2% (Figure 1). The Wells Dam Tailrace monitor was out of order from June 11th to June 13th.

Since last week, the FPC staff has received clarification on the location of the Chief Joseph tailrace TDG monitor. This monitor is located on the spillway side of the project and only measures TDG levels in water from the spillway. In addition, the FPC has learned that this tailrace monitor was placed into a pipe, on or around June 5th, in order to protect it during the high flows and spill this year. These two factors result in TDG readings that are likely unrepresentative of tailrace TDG. This is evident when considering that TDG levels in the Wells Dam forebay have routinely been about 5% higher than the Chief Joseph tailrace since June 5th (Figure 1). Over the season, the 12-hour average TDG levels in the Wells Dam forebay have ranged from 102.7% to 129.1%.

GBT incidences at Rock Island Dam have increased over the past week. On June 22nd, the GBT incidence level was nearly 11%, followed by 26% incidence on June 23rd (Figure 1). The GBT incidence from the June 23rd sample exceeded the 15% GBT criterion for the curtailment of spill. Rock Island saw no signs of severe fin GBT this week.

The 12-hr average TDG downstream of GCL has remained above 120% since May 18th, and has been as high as 144%. Given the location of the Chief Joseph tailrace monitor, it is difficult to determine how well spill from this project has done at decreasing excess TDG from Grand Coulee Dam. It is likely that the high incidences of GBT at RIS are due to high TDG from all projects above RIS. In fact, with exception to the Chief Joseph tailrace monitor, the 12-hour average TDG at all monitors above RIS has been above 120% since May 28th (Figure 1). The 12-hour average TDG at the Chief Joseph tailrace monitor was above 120% from May 28th to June 5th, which is about the time that it was relocated to inside the pipe.

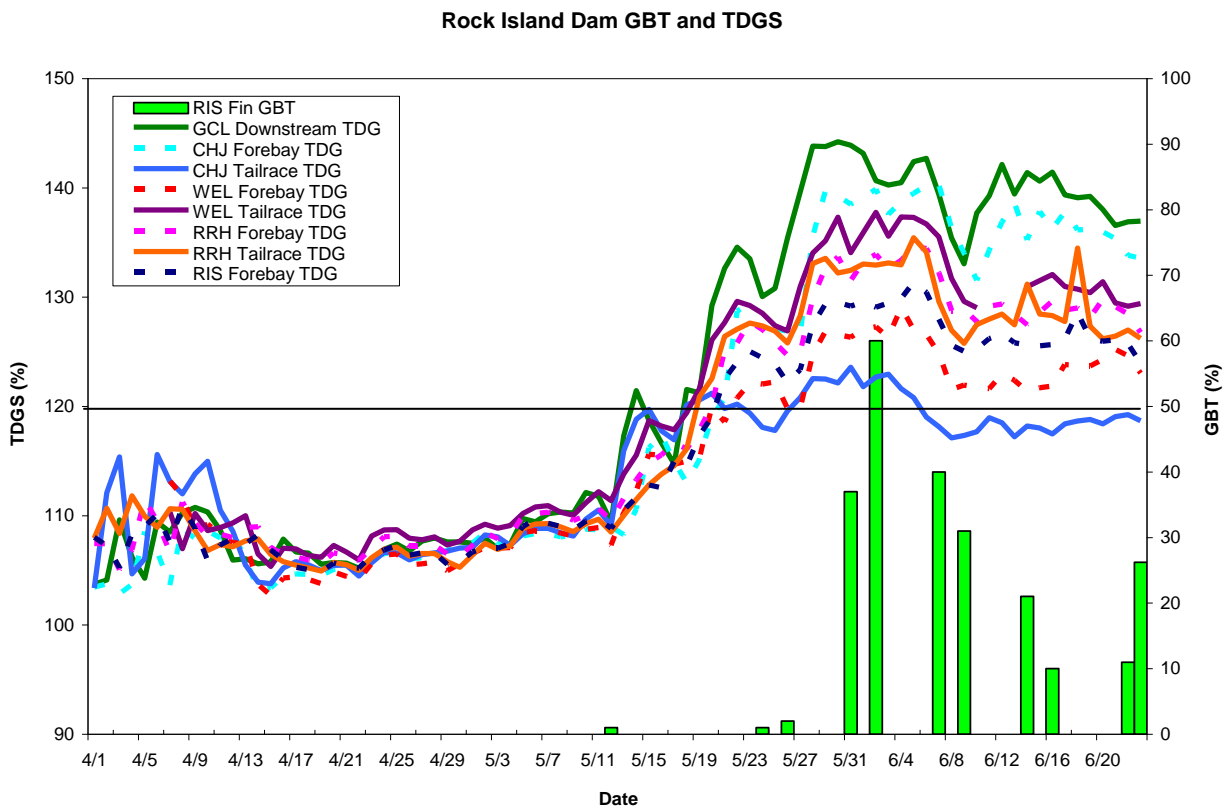


Figure 1. Percent of fish examined at Rock Island Dam showing signs of fin GBT with associated dissolved gas saturation levels in the Rock Island Dam forebay, the Rocky Reach Dam tailrace, and downstream of Grand Coulee Dam. Horizontal line at the 120% TDG level provided for reference.

Snake River Monitoring:

Gas Bubble Trauma monitoring takes place at three sites in the Snake River: Lower Granite, Little Goose, and Lower Monumental dams. These examinations are typically conducted once a week at each site. GBT monitoring at Lower Granite Dam can be considered a baseline estimate,

as there is little TDG production from the projects above LGR. To date, the 12-hour average TDG levels (based on Oregon methodology) in the Lower Granite Dam forebay have ranged from 103.2 to 109.1%, while the 12-hour average TDG levels in Dworshak Dam tailrace have ranged from 98.1 to 121.9%. To date, GBT monitoring at Lower Granite Dam continues to reveal no incidences of GBT (Figure 2).

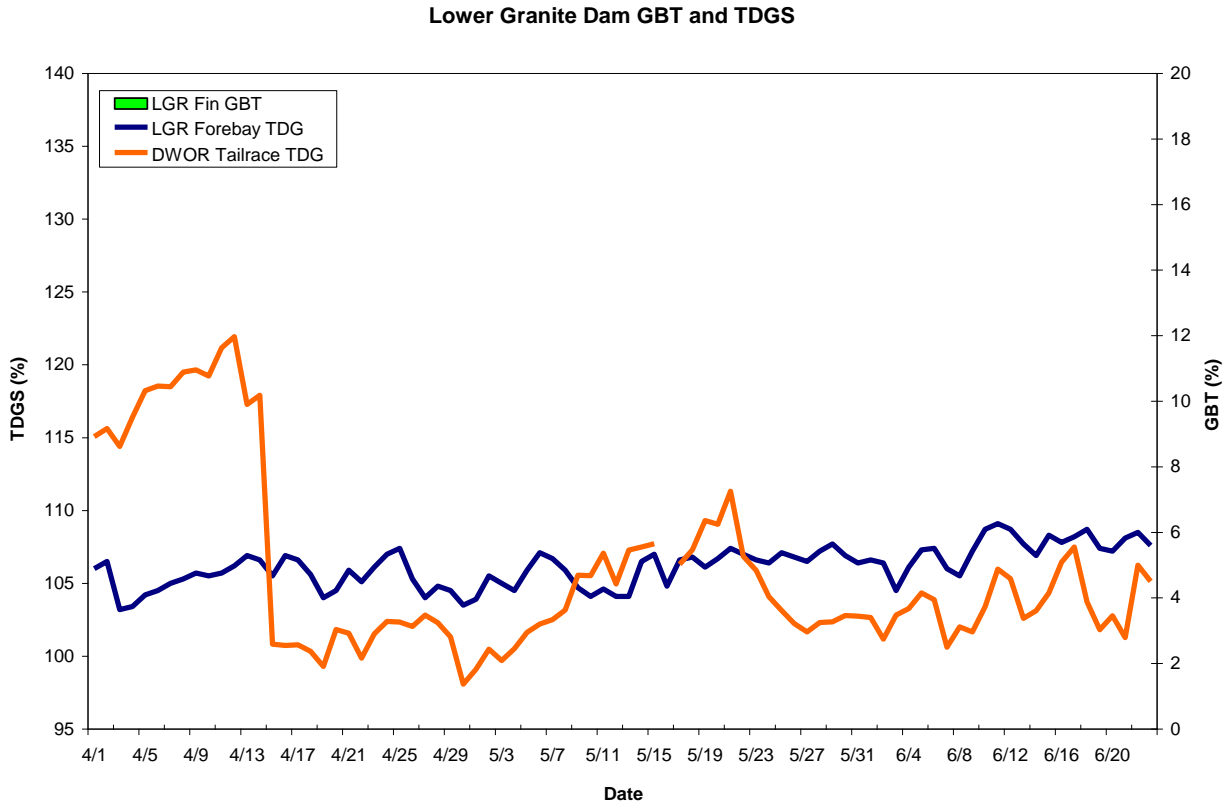


Figure 2. Percent of fish examined at Lower Granite Dam showing signs of fin GBT with associated dissolved gas saturation levels in the Lower Granite Dam forebay and the Dworshak Dam tailrace.

To date, the 12-hour average TDG levels (based on Oregon methodology) in the Little Goose Dam forebay have ranged from 105.9 to 125.5%, while the 12-hour average TDG levels in Lower Granite Dam tailrace have ranged from 108.7 to 132.2%. Incidences of GBT have decreased with this week’s sample. The incidence of GBT from the June 20th sample was 2%, which is down from nearly 14% on June 13th (Figure 3). Due to a complete powerhouse outage, GBT monitoring at LGS did not take place during May 24th to June 1st.

Little Goose Dam GBT and TDGS



Figure 3. Percent of fish examined at Little Goose Dam showing signs of fin GBT with associated dissolved gas saturation levels in the Little Goose Dam forebay and the Lower Granite Dam tailrace.

To date, the 12-hour average TDG levels (based on Oregon methodology) in the Lower Monumental Dam forebay have ranged from 105.0 to 139.3%, while the 12-hour average TDG levels in Little Goose Dam tailrace have ranged from 110.6 to 138.6%. The incidence of GBT from the June 22nd sample was 4%, which is lower than the 8% GBT incidence that was seen on June 15th (Figure 4).

Lower Monumental Dam GBT and TDGS

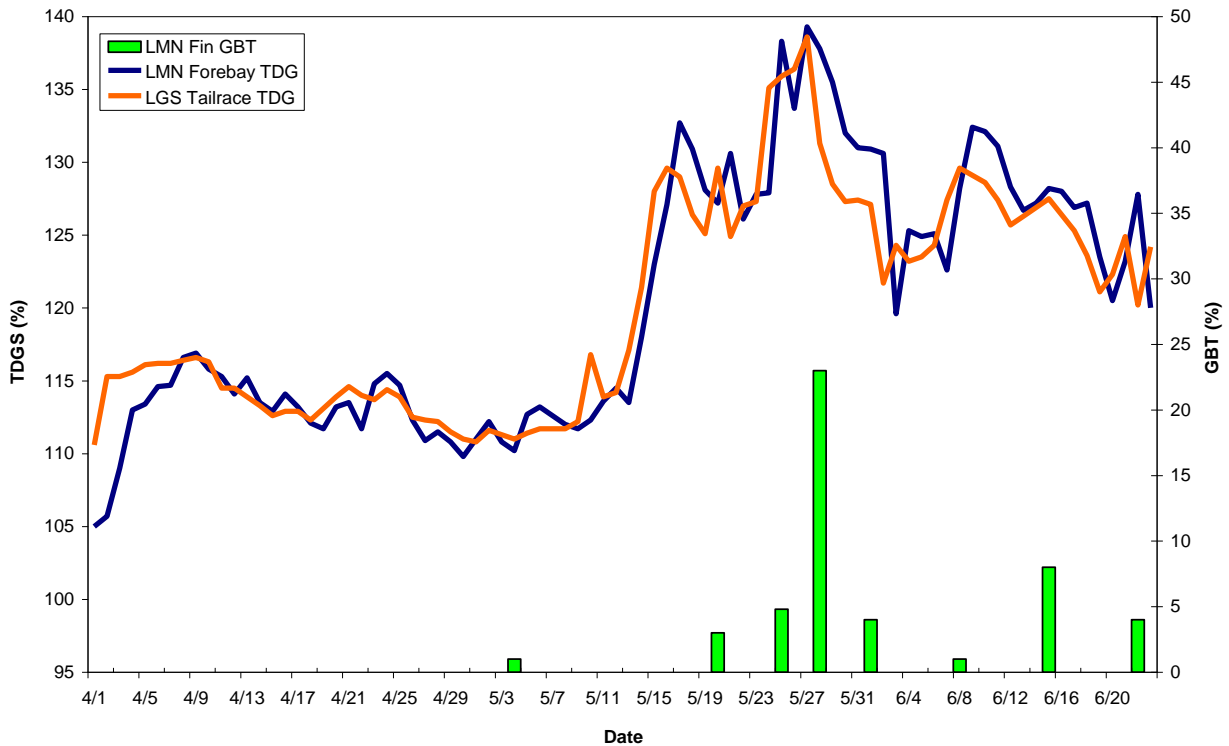


Figure 4. Percent of fish examined at Lower Monumental Dam showing signs of fin GBT with associated dissolved gas saturation levels in the Lower Monumental Dam forebay and the Little Goose Dam tailrace.

Lower Columbia Monitoring:

Gas Bubble Trauma monitoring takes place at two sites in the Lower Columbia River: McNary and Bonneville dams. These examinations are typically conducted twice a week at each site. To date, the 12-hour average TDG levels (based on Oregon methodology) in the McNary Dam forebay have ranged from 106 to 122.0%, while the 12-hour average TDG levels in the Ice Harbor Dam tailrace have ranged from 115.1 to 130.6%. The 12-hour average TDG levels from the Priest Rapids tailrace have ranged from 104.2 to 129.0%. GBT incidence at McNary Dam has remained low over the past week, with a 1% fin GBT incidence on June 17th, 2% GBT incidence on June 19th, and 0% GBT incidence on June 23rd (Figure 5).

To date, the 12-hour average TDG levels (based on Oregon methodology) in the Bonneville Dam forebay have ranged from 106.9 to 124.3%, while the 12-hour average TDG levels in The Dalles Dam tailrace have ranged from 109.4 to 126.3%. There have been no incidences of GBT at Bonneville Dam this week (Figure 6).

Based on the GBT monitoring this week, the 15% fin GBT action criterion for curtailment of voluntary spill was only met at Rock Island Dam on June 23rd. However, all Snake and Columbia River projects continue to operate under uncontrolled spill and, thus, specific actions to curtail spill are not available. The 5% severe fin GBT action criterion has not been met at any of the GBT monitoring sites so far this year.

McNary Dam GBT and TDGS

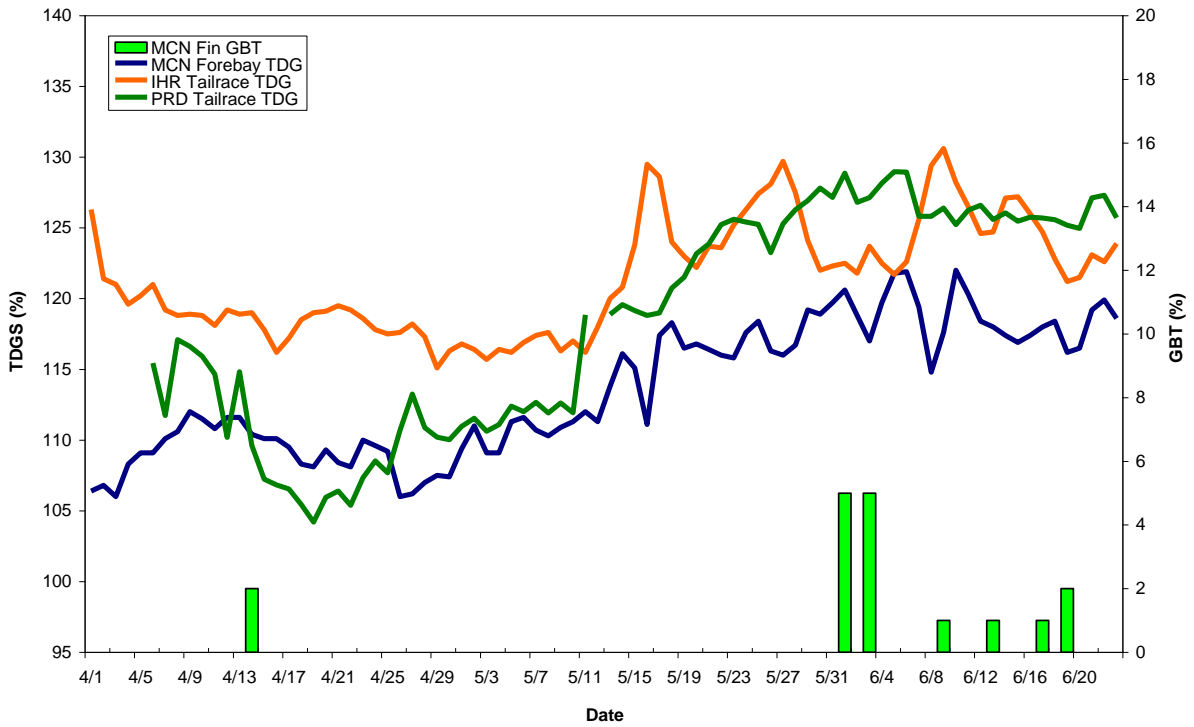


Figure 5. Percent of fish examined at McNary Dam showing signs of fin GBT with associated dissolved gas saturation levels in the McNary Dam forebay and the Ice Harbor Dam tailrace.

Bonneville Dam GBT and TDGS

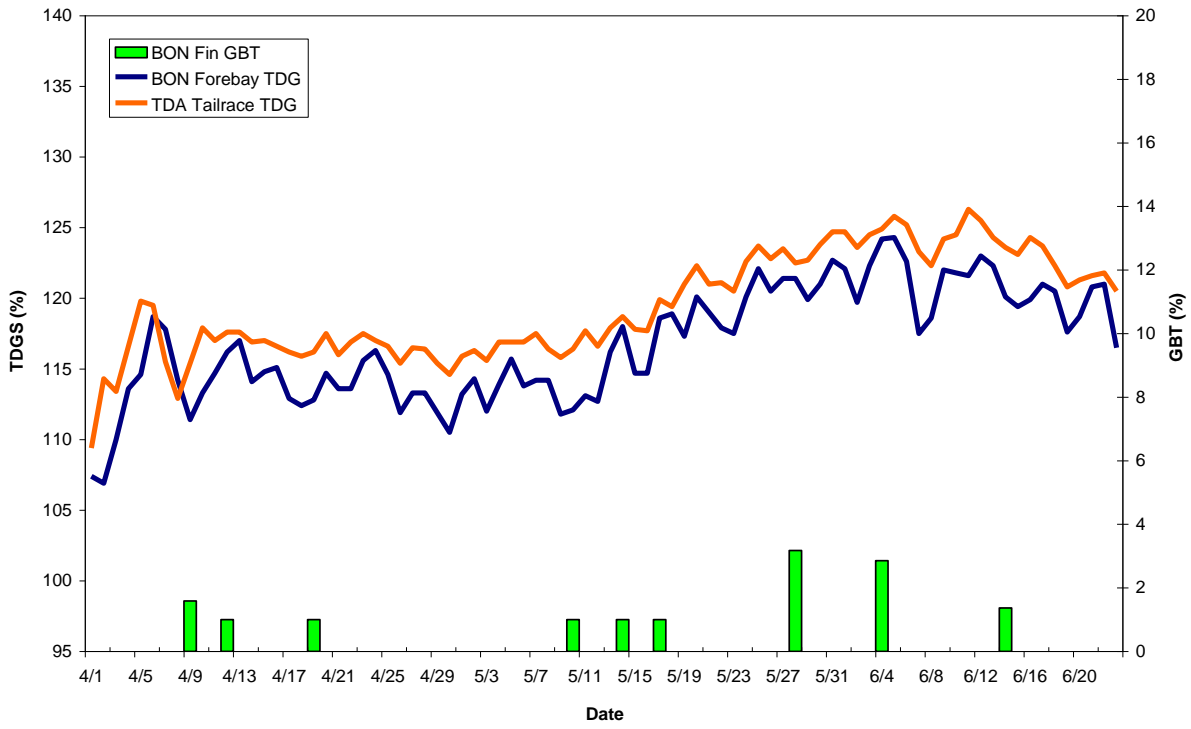


Figure 6. Percent of fish examined at Bonneville Dam showing signs of fin GBT with associated dissolved gas saturation levels in the Bonneville Dam forebay and The Dalles Dam tailrace.



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DATA REQUEST FORM

Request Taken By: Michele DeAart Date: 24-June-2011

Data Requested By:

Name: Bill Twait (WDFW) Phone: _____
Address: _____ Fax: _____
_____ Email: _____

Data Requested:

Update GBT memo from June 17 with data
for part week (June 17-23).

Data Format: Hardcopy Text Excel

Delivery: Mail Email Fax Phone

Comments:

Data Compiled By: [Signature] Date: 24-June-2011

Request # 53

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